

A. AMENDMENTS TO CLAIMS

Please amend the claims as indicated hereinafter.

1. (CURRENTLY AMENDED) A machine implemented method for replicating content of a source disk to at least one of a plurality of target disks, comprising:
establishing at most one producer process for reading content of a source disk into a buffer;
establishing at least one consumer process for reading content from the buffer and writing the content to a target disk; and
coordinating concurrent synchronous copy operations by the producer process from the source disk to the buffer and by the at least one consumer process from the buffer to the target disk.
2. (CURRENTLY AMENDED) The method of claim 1, wherein coordinating concurrent synchronous copy operations by the producer process from the source disk to the buffer and by the at least one consumer process from the buffer to the target disk comprises semaphore based synchronization of multiple concurrent copy operations into and from a shared memory.
3. (CURRENTLY AMENDED) The method of claim 1, wherein establishing at least one consumer process for reading content from the buffer and writing the content to a target disk comprises establishing at least one subsequent consumer process for reading data from the buffer and writing the content to a target disk, wherein the subsequent consumer process commences reading data from the shared buffer at a point where the producer process has last written data.
4. (CURRENTLY AMENDED) The method of claim 3, wherein coordinating concurrent synchronous copy operations by the producer process from the source disk to the buffer and by the at least one consumer process from the buffer to the target disk comprises blocking the producer process from overwriting a portion of data in the shared buffer until each of the consumer processes has read the portion of data.

5. (CURRENTLY AMENDED) The method of claim 4, thereby enabling the producer to process to make only one pass through the content of the source disk.
6. (CURRENTLY AMENDED) The method of claim 3, wherein coordinating concurrent synchronous copy operations by the producer process from the source disk to the buffer and by the at least one consumer process from the buffer to the target disk comprises blocking each of the consumer processes from reading content of the buffer until the producer process has written a portion of data that the consumer process has not yet read.
7. (ORIGINAL) The method of claim 6, thereby enabling pacing of the producer process by a consumer process.
8. (CURRENTLY AMENDED) The method of claim 3, wherein establishing at least one subsequent consumer process for reading data from the buffer and writing the content to a target disk comprises detecting when a consumer process has reached the end of a disk image in the shared buffer and cycling the consumer process to continue reading content stored in the buffer, which content was read from the source disk and stored in the buffer by the producer process.
9. (CURRENTLY AMENDED) The method of claim 8, wherein establishing at least one subsequent consumer process for reading data from the buffer and writing the content to a target disk further comprises detecting when a consumer process has read a complete disk image from the shared buffer.
10. (ORIGINAL) The method of claim 1, wherein a process determines whether the process is a producer process or a consumer process by detecting the presence of other disk replication processes in the system.
11. (CURRENTLY AMENDED) A computer-readable medium carrying one or more sequences of instructions for replicating a disk, which instructions, when executed by one or more processors, cause the one or more processors to carry out the steps of:
establishing at most one producer process for reading content of a source disk into a
buffer;

establishing at least one consumer process for reading content from the buffer and writing the content to a target disk; and
coordinating concurrent synchronous copy operations by the producer process from the source disk to the buffer and by the at least one consumer process from the buffer to the target disk.

12. (CURRENTLY AMENDED) The computer-readable medium of claim 11, wherein the instructions for carrying out the step of coordinating concurrent synchronous copy operations by the producer process from the source disk to the buffer and by the at least one consumer process from the buffer to the target disk comprises the instructions for carrying out a step of synchronizing using semaphores multiple concurrent copy operations into and from a shared memory.
13. (CURRENTLY AMENDED) The computer-readable medium of claim 11, wherein the instructions for carrying out the step of establishing at least one consumer process for reading content from the buffer and writing the content to a target disk comprises the instructions for carrying out a step of establishing at least one subsequent consumer process for reading data from the buffer and writing the content to a target disk, wherein the subsequent consumer process commences reading data from the shared buffer at a point where the producer process has last written data.
14. (CURRENTLY AMENDED) The computer-readable medium of claim 13, wherein the instructions for carrying out the step of coordinating concurrent synchronous copy operations by the producer process from the source disk to the buffer and by the at least one consumer process from the buffer to the target disk comprises the instructions for carrying out a step of blocking the producer process from overwriting a portion of data in the shared buffer until each of the consumer processes has read the portion of data.
15. (CURRENTLY AMENDED) The computer-readable medium of claim 14, thereby enabling the producer to process to make only one pass through the content of the source disk.

16. (CURRENTLY AMENDED) The computer-readable medium of claim 13, wherein the instructions for carrying out the step of coordinating concurrent synchronous copy operations by the producer process from the source disk to the buffer and by the at least one consumer process from the buffer to the target disk comprises the instructions for carrying out a step of blocking each of the consumer processes from reading content of the buffer until the producer process has written a portion of data that the consumer process has not yet read.
17. (ORIGINAL) The computer-readable medium of claim 16, thereby enabling pacing of the producer process by a consumer process.
18. (CURRENTLY AMENDED) The computer-readable medium of claim 13, wherein the instructions for carrying out the step of establishing at least one subsequent consumer process for reading data from the buffer and writing the content to a target disk comprises the instructions for carrying out a step of detecting when a consumer process has reached the end of a disk image in the shared buffer and cycling the consumer process to continue reading content stored in the buffer, which content was read from the source disk and stored in the buffer by the producer process.
19. (CURRENTLY AMENDED) The computer-readable medium of claim 18, wherein the instructions for carrying out the step of establishing at least one subsequent consumer process for reading data from the buffer and writing the content to a target disk further comprises the instructions for carrying out a step of detecting when a consumer process has read a complete disk image from the shared buffer.
20. (ORIGINAL) The computer-readable medium of claim 11, wherein a process determines whether the process is a producer process or a consumer process by execution of instructions for carrying out a step of detecting the presence of other disk replication processes in the system.
21. (CURRENTLY AMENDED) An apparatus comprising:
means for establishing at most one producer process for reading content of a source disk into a buffer;

means for establishing at least one consumer process for reading content from the buffer and writing the content to a target disk; and
means for coordinating concurrent synchronous copy operations by the producer process from the source disk to the buffer and by the at least one consumer process from the buffer to the target disk.

22. (CURRENTLY AMENDED) An apparatus comprising:
a producer engine operative to copy data from a source disk to a sharable work area;
at least one consumer engine operative to copy data from the sharable work area to a destination disk; and
a coordination engine operative to coordinate the producer engine, at least one consumer engine and the sharable work area;
thereby providing a single pass read of data from the source disk to be replicated to one or more ~~destinations~~ destination disks by individual instances of consumer engines having non-concurrent start times.

23. (CURRENTLY AMENDED) A system, comprising:
a first computer, operatively configured to execute program instructions for performing the steps of:
establishing a producer process for reading content of a source disk into a buffer;
establishing at least one consumer process for reading content from the buffer and writing the content to a target disk; and
coordinating concurrent synchronous copy operations by the producer process from the source disk to the buffer and by the at least one consumer process from the buffer to the target disk; and
a second computer, operative to execute program instructions for performing the steps of:
monitoring the first computer; and
a network interconnecting the first computer and the second computer.

24. (CURRENTLY AMENDED) A system, comprising:
a first network node;
a second network node; and

a network connecting the first node and the second node, wherein:
the first network node comprises program instructions for causing one or more processors
to perform the step of:
establishing a producer process for reading content of a source disk into a buffer;
and
the second network node comprises program instructions for causing one or more
processors to perform the step of:
establishing at least one consumer process for reading content from the buffer and
writing the content to a target disk; and
wherein at least one of the first node and the second node further comprises program
instructions for causing one or more processors to perform the step of:
coordinating concurrent synchronous copy operations by the producer process
from the source disk to the buffer and by the at least one consumer process
from the buffer to the target disk.